



# Benzene

## Health Effects and Reducing Exposure

Benzene

Environmental Health Education  
Center, University of Maryland  
School of Nursing

# Learning Objectives

- ☀ Describe characteristics and identify sources of Benzene
- ☀ Discuss Health Effects of Benzene
- ☀ Determine actions for reducing exposures to Benzene

# Uses and Sources

- ★ Colorless liquid, sweet odor, evaporates quickly, highly flammable
- ★ Found at 813 National Priority List Sites
- ★ Produced during the burning of gasoline, cigarettes, volcanoes, and forest fires
- ★ Used in plastics, resins, nylon, and synthetic fibers, some rubbers, lubricants, dyes, detergents, drugs, pesticides

# How Are We Exposed?

## ☀ Inhalation

- ☀ Gasoline vapors
- ☀ Cigarette smoke (first and second hand)
- ☀ Vapors from contaminated steam during showering or cooking

## ☀ Ingestion

- ☀ Contaminated groundwater

## ☀ Skin Contact

# Health Effects: Acute Inhalation

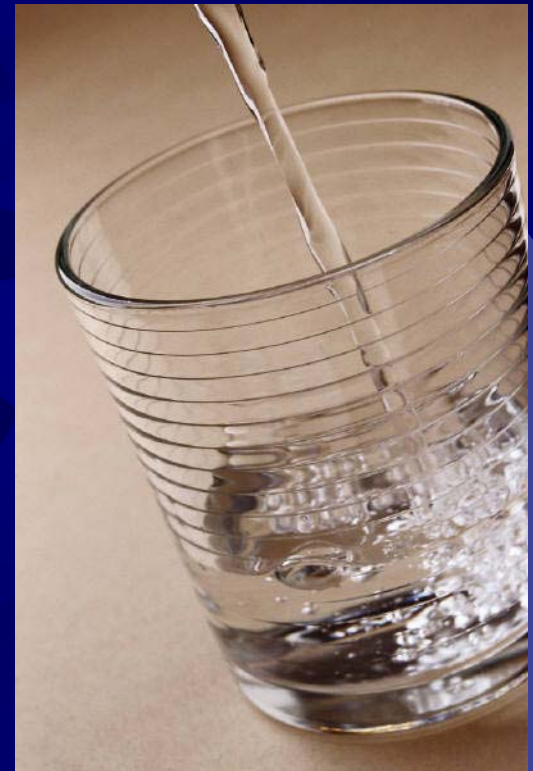
- ☀ Drowsiness
- ☀ Dizziness
- ☀ Fast heart rate
- ☀ Headache
- ☀ Tremors
- ☀ Confusion
- ☀ Unconsciousness
- ☀ Death



# Health Effects: Ingestion – High Level

## ☀ Food or water

- ☀ Nausea/vomiting
- ☀ Stomach irritation
- ☀ Dizziness
- ☀ Sleepiness
- ☀ Convulsions
- ☀ Fast heart rate
- ☀ Death



# Health Effects: Skin Contact

- ☀ Redness
- ☀ Sores
- ☀ Eye irritation



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# Health Effects: Chronic

- ✱ Decreased blood production
- ✱ Inability to fight infection
- ✱ Cancer: Acute myeloid leukemia
- ✱ Low birth weight
- ✱ Delayed fetal bone formation
- ✱ Injury to reproductive organs leading to infertility and difficulty getting pregnant

# Indication of Exposure

- ✦ Breath test – only useful shortly after exposure, cannot detect low levels
- ✦ Blood and bone marrow – only indicates recent exposures
- ✦ Urine for benzene breakdown products, such as phenol – may not be specific for benzene exposure

# How to Reduce Risk

- ✦ Avoid breathing or ingesting vapors
- ✦ Wear protective respiratory equipment and gloves
- ✦ Ensure adequate ventilation where fumes are present
- ✦ If exposed at work
  - ✦ Wash immediately and before going home
  - ✦ Change clothes at work, launder separately

# Policy



## ★ EPA Maximum Contaminant Level

- ★ Water: 5 parts per billion (ppb)
- ★ Air: 0.4 ppb
- ★ Goal for both air and water: 0 ppb

# Policy

- ☀ OSHA 8 hour day/40 hour week limit for air exposure is 1 part per million (ppm) with a short-term air exposure limit of 5 ppm
- ☀ NIOSH recommends use of special respiratory equipment when handling benzene

# Resources

- ☀ ATSDR fact sheet

[www.atsdr.cdc.gov/tfacts3.pdf](http://www.atsdr.cdc.gov/tfacts3.pdf)

- ☀ NJ fact sheet

[www.state.nj.us/health/eoh/rtkweb/1929.pdf](http://www.state.nj.us/health/eoh/rtkweb/1929.pdf)

# In Review

- ☀ What is benzene and how are we exposed to it
- ☀ How does benzene effect our health
- ☀ How can we reduce our exposure to benzene

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